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Case Against Gallo Faces Tough Appeals Process

The Office of Research Integrity (ORI), the agency responsible for assuring scientific purity in the agencies of the Public Health Service, has suffered heavy reverses in its efforts to sustain its findings of scientific misdeeds by the most renowned target on its docket, Robert C. Gallo.

Accused by ORI of filching credit for discovery of the AIDS virus from the Pasteur Institute, Gallo defends himself as a human benefactor victimized by scientifically illiterate bureaucrats. His detractors depict him as an unscrupulous glory seeker with a well-established record of unseemly tactics in the conduct of research.

ORI's case against Gallo is scheduled for a courtroom-style hearing starting November 8, before the Departmental Appeals Board of the Department of Health and Human Services, parent agency of Gallo's homebase, the National Institutes of Health. Reflecting the complexity of the case, which has simmered on from events that occurred in 1983 and 1984, the hearing is expected to run for at least three weeks,

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with a score or more of witnesses called to testify, including many eminent figures in the biomedical sciences. In response to a request from ORI, the Appeals Board, which consists of five lawyers, has agreed to an innovation in its proceedings: inclusion of a non-lawyer scientist as a voting member of the Research Integrity Adjudications Panel that will hear Gallo's appeal. SGR hears that both sides and the Board have agreed on Julius Younger, a retired scientist formerly at the University of Pittsburgh.

At this point, ORI is the underdog by a substantial margin. In pre-hearing proceedings, the Appeals Board has been openly skeptical of ORI's evidence and has rapped the quality of ORI's pre-hearing "offer of proof" as sloppily prepared and "replete with argument, inflammatory language, and conclusions which inappropriately go beyond simply explaining" the evidence against Gallo.

On September 27, in a ruling citing these factors, the Board dismissed three of ORI's five findings against Gallo on grounds of insufficient evidence, and raised extremely high hurdles for proving the remaining two: that Gallo, while serving in an unusual dual role as a peer reviewer for *Science* and shepherd of a paper for Pasteur colleagues, rewrote portions of the paper to deflect deserved credit from the

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Engineering Academy Hears Gloomy Views on Economy

Oratorical gloom held a prominent place on the program last week at the annual meeting of the National Academy of Engineering (NAE), an august body of 1673 members that represents itself as the cream of the profession. With half the academicians drawn from the downsizing corporate sector, and 42 percent from the world of financially crimped universities, the dour proceedings fit the times.

NAE President Robert M. White commenced the meeting with a funereal address titled "What Is at the End of the Technological Rainbow?" Answer: Unemployment induced by technological change—a frank but unusual assessment in the high temple of engineering.

Studies by the NAE and others had previously identified
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In Brief

The institutional reverence that traditionally accompanies the job seems to have bypassed Bruce Alberts, the new President of the National Academy of Sciences. Addressing the DC Science Writers Association last month, Alberts said Sen. Robert Kerrey (D-Neb.) recently asked him what the Academy does. "I told him that the Academy is 1600 scientists who elect each other. We have a party in April. Otherwise, we don't do anything."

No Hurry: Walter Massey stepped down as NSF Director in April, after giving the Clinton White House three months' notice of his departure plans. It wasn't until July 13 that the President announced his intention to nominate Neal Lane, Provost of Rice University, for the job, but the nomination didn't arrive in the Senate until September 8. Lane was confirmed, without a confirmation hearing, on October 8.

The same torpid pace applies to the selection of Harold Varmus for Director of NIH, successor to Bernadine Healy, who gave notice in February and left in June. The intention to nominate Varmus was announced by the White House on August 3. The nomination reached the Senate on October 4. Varmus is a shoo-in, but he's still waiting. The delays, far beyond the normal start-up problems of a new Administration, signify uninhibited confusion in high places.

Has Hillary heard? Three contracts for development of a totally implantable artificial heart were announced by the National Heart, Lung, and Blood Institute on September 30. Stating a goal of human testing in the year 2000, Institute Director Claude Lenfant said, "Our challenge is to prevent as many as possible of the 250,000 deaths from heart failure which occur in the US each year."

... Something New Happening in the US Economy?

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technology as a net job creator, White said, even when new technologies eliminated jobs. "Conventional wisdom," he reminded the audience, "holds that job displacement in manufacturing industries will be accommodated in the services industries as manufacturing employment decreases or in entirely new manufacturing industries."

But, White continued, something new seems to be occurring in today's economy as the result of new technology. A recent economic study, White said, "has noted that white collar unemployment has now reached parity with blue collar unemployment for the first time."

"This phenomenon raises the question of whether the service industries will remain the engine of job growth as they have been in the past. Indeed," he went on, "the same forces that have slowed the growth of manufacturing employment while raising manufacturing output appear to be affecting many service industries."

White observed that "modern communications and low wages permit a growing number of service functions to be foreign sourced"—i.e., performed abroad. And he rattled off a list of job reductions:

"In the Washington area, over 5000 service sector jobs have disappeared just in the past two years. The National Geographic Society will cut the number of workers at its customer service center in Gaithersburg [Md.] in half as a result of automation. Bell Atlantic has seen its work force shrink by 10,000 people, from 80,000 to 70,000 since 1989. The government work force has not been immune." And so on.

"Clearly," White said, "some of these changes result from improved management of enterprises and restructuring of operations, but it is also true that technological advance is a part of the story." He then proceeded to ask a series of nettlesome questions not usually associated with the gung-ho optimism of big-league engineering:

"Is it possible that we are facing a historical shift in our expectation that the employment situation will right itself in a time frame compatible with other social and political adaptations, as it has in the past?

"Is our faith in historical precedent well founded? Will the rate of creation of new industries be adequate to provide the jobs that are lost as a result of productivity increases? Or does the current rate of change caused by the introduction of new technology far exceed the political, social, and economic capacity for social change?

"The answer is that nobody knows," White said, adding that "we have limited ability to forecast the propensities of our evolving social and economic systems for rapid adaptation."

The NAE President warned in closing: "No matter how important ... productivity growth is to society as a whole in creating wealth and raising living standards, the consequences for an individual thrown out of work by technologi-

cal advance can be devastating. If the number of individuals affected is large relative to the population of a locality or to the total number of people working in an industry, the personal becomes the political as companies and governments are urged and pressured to help."

Rep. George Brown, the philosophizing Chairman of the House Science, Space, and Technology Committee, treated the NAE membership to a dose of vintage handwringing about the benefits and burdens of technology, with ample oratorical bows to a modern pioneer of this genre, Lewis Mumford. In a talk titled "Engineers: The Navigators for a Sustainable Future," Brown said, "Mumford is eloquent in telling us that we indiscriminately embrace whatever we are able to make, instead of making what will take us where we want to go."

"In speaking of science and technology," Brown told the NAE audience, Mumford said, "Western society has accepted as unquestionable a technological imperative that is quite as arbitrary as the most primitive taboo: Not merely the duty to foster invention and constantly to create technological novelties, but equally the duty to surrender to these novelties unconditionally, just because they are offered."

Brown urged the engineers to regard environmental impact as a prime consideration in design. He also exhorted them to train the next generation of engineers to "do more than retrofit existing factories with green design, or create new green manufacturing systems for plants yet to be built. They must also possess an holistic orientation to sustainable development so that they will be equipped to influence social change as they implement technical change."

The Clinton Administration's response to technological and economic change was described by the No. 2 in the Pentagon, Deputy Secretary of Defense William J. Perry. Perry told the NAE members that DOD aims to belt out billions of dollars to help defense industries convert to civilian markets. At the same time, he said, the Pentagon will also provide funds to help civilian firms that can satisfy defense requirements.

The SEMATECH model of Pentagon-industrial financing of research on semiconductor manufacturing will be emulated in a consortium to assist shipbuilding—

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... ORI Must Prove Intent to Deceive, Board Rules

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French AIDS researchers; also, that he misrepresented Pasteur's accomplishments to advance his own claims to priority by stating in a report in *Science* in 1984 that the French virus, LAV, had not yet been transmitted to a permanently growing cell line. The statement was "patently misleading," and designed to boost Gallo's claim to priority, ORI charges.

To sustain those findings, the Board has ruled, ORI must establish intent or motivation on Gallo's part and must also demonstrate that the alleged offenses violated generally accepted scientific standards at the time and that Gallo was aware of the transgressions.

The ORI findings that were dismissed concerned Gallo's role in another 1984 paper in *Science* deemed riddled with false statements, his managerial style as a laboratory chief at NIH, and his alleged hoarding of reagents in the early days of AIDS research. The Board has already heard an appeal of ORI's misconduct findings against Mikulas Popovic, who worked in Gallo's lab and co-authored the disputed papers. A decision in Popovic's case is expected before the Gallo proceedings open on November 8.

ORI has devoted enormous efforts to its pursuit of Gallo, who may well be the most investigated scientist of all time. If faculty club gossip and hallway chatter could convict, he'd be gone. In one of the kinder assessments of his performance, an expert advisory panel convened by the government's investigators termed Gallo's tight control over a cell line in AIDS research "essentially immoral in view of the growing seriousness of the AIDS epidemic." An earlier investigation, by the predecessor of ORI, strongly criticized Gallo's behavior, but said his performance fell short of scientific misconduct, the peak offense in the hierarchy of scientific wrongdo-

ing. Upon receiving the report last year, Bernadine Healy, then Director of NIH, declared Gallo "exonerated," though the report strongly criticized him on many grounds, including "disregard for accepted standards of professional and scientific ethics."

ORI went back for another look and came up with findings of one count of misconduct and four lesser offenses, all of which, in preparation for Gallo's appeal, were upgraded to misconduct by edict of the Appeals Board. Fulfilling the nightmares of the scientific establishment, the misconduct process for the PHS has gradually slipped away from judgment by scientific criteria and moved toward conventional legal standards, particularly intent, materiality, and firm evidence. The Appeals Board employs preponderance of evidence as a standard of proof, rather than the more rigorous criminal justice standard of proof beyond a reasonable doubt. But even the lesser standard is higher than that contemplated by the original scientist architects of the PHS misconduct system.

In the late 1980s, when politics and the press played up a series of scientific fraud cases as evidence of disturbing ethical laxity in research, the leaders of the research establishment reacted disdainfully, dismissing the episodes as rare and inconsequential. But when several Congressmen, notably the thunderous John Dingell, proceeded to pound on the issue, the scientific chieftains yielded to the extent of accepting a system that would make science the guardian of its own standards and performance.

Exclusion of lawyers and control by scientists was the agreed-upon principle. On advice of sympathetic lawyers, the word "fraud" was excluded from the process, on the grounds that it is a criminal offense that requires proof of intent. Instead, "misconduct" became the key word, and it was generally understood that proof that an offense had occurred was sufficient to nail the perpetrator, without the legal niceties of intent or knowledge of the ground rules.

The aversion to lawyers was reflected in the staffing and working style of ORI's predecessor, the Office of Scientific Integrity (OSI), founded in 1989 in the office of the Director of NIH as an investigative agency. A companion function, the Office of Scientific Integrity Review, was located up the line in the Department of Health and Human Services. Lawyers were notably absent from both shops.

The two-step system was still in its infancy when Bernadine Healy became Director of NIH in 1991. She promptly trashed OSI on a variety of grievances, ranging from its demonstrably incoherent management to allegations of coziness with complainants against eminent scientists. Healy charged that OSI was a sieve for leaks to the press—which indeed it was.

On the sidelines, raising embarrassing questions about OSI's competence, were Walter Stewart and Ned Feder, NIH staff members who had turned their hobby of studying scientific misconduct into a fulltime occupation. For a time,

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Academy of Engineering

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MARITECH. Export regulations will be eased or eliminated to help high-tech firms sell abroad, Perry added, and defense labs "will be consolidated, because we have greater capacity than we can support."

Perry said every move to reorient federal resources to the commercial sector "threatens entrenched interests and meets with resistance." At an early stage of discussions in the Pentagon about shifting maintenance work from military depots to industry, he said, Congress heard of the plan and drafted a bill to oppose it. "This proves," Perry said, "that Washington is the only town where the speed of sound exceeds the speed of light."

Perry also said that he and his Pentagon team were moving as quickly as possible to reorganize defense research and especially to promote dual-use programs embracing the military and civilian sectors. "You never know if the Administration will have a second term," he said, adding: "I've set my program for four years."

... ORI Picked Appeals Board and Pays for Services

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they were detailed from NIH to serve on Dingell's staff. Meanwhile, the disciplinary system run by scientists, with little or no legal assistance, was under legal fire by lawyers for accused scientists who said their rights had been trampled under OSI's procedures.

The misconduct system was a discredited shambles in 1992, when it was taken out of NIH and reconstituted as the Office of Research Integrity in the Department of Health and Human Services. The new organization came with a built-in recognition of the legal problems inherent in accusing professional scientists of serious offenses that could wreck their careers.

The change of attitude can be seen in the role of lawyers in the new and old misconduct organizations: OSI had no legal counsel of its own, and depended, when it couldn't do otherwise, on parttime advice from lawyers detailed to NIH from the Department's Office of the General Counsel. Its successor, ORI, has a fulltime staff of seven attorneys, as part of its overall staff of about 50. The ORI lawyers are also on detail from the Department's General Counsel, as are virtually all attorneys in agencies of the PHS—a system devised to assure legal coherence throughout the sprawling Department. But the seven lawyers work exclusively for ORI.

The shift from science to law, still in an early and uncertain state of transition, has been pushed by several factors besides counterfire by lawyers for accused scientists. Within the scientific community itself, concerns have been expressed about the absence of safeguards traditional to the criminal justice system, particularly the right to confront an accuser. Not all accept the argument that scientists can decide these matters on professional terms without the help of lawyers. Responding to pressure for "due process," ORI added the right of appeal to its process.

Ironically, the Appeals Board, whose rulings have rattled ORI, occupies a decisive position in judging scientific integrity because it was selected by ORI, in November 1992, to serve as the ultimate place of appeal. ORI even helps finance what has turned out to be its severest critic. Because of the additional workload involved, ORI pays the Appeals Board about \$250,000 a year for salary and expenses for two additional staff members.

In contrast to the ORI system, the National Science Foundation keeps its disciplinary system inhouse. Misconduct cases are investigated by the Office of the Inspector General at NSF; findings of misconduct are reviewed by a panel of the National Science Board and by the Director of NSF. Debarment—i.e., denial of further federal funding—can be appealed to an Administrative Law Judge assigned by the federal Office of Personnel Management. But the misconduct finding itself is untouchable, and so far, none of the Foundation's miscreants has challenged a debarment. NSF's misconduct system hasn't collided with any scientific celebrities, which may account for its low profile, but it does

Gallo's "Deficiencies"

In response to the Departmental Appeals Board's request for proof in support of ORI's misconduct findings against Robert Gallo, ORI compiled a list of allegedly inglorious occurrences in Gallo's career as evidence of his failures as a lab chief. Will the list be admissible at the hearing starting November 8? The Board, in reply, said that "we will not admit evidence of other alleged wrongs or acts unless they have direct bearing on issues such as motive or intent." The following is from the ORI "offer of proof."

... ORI will document Dr. Gallo's continued supervisory deficiencies with (1) the dismissal and felony convictions [for financial irregularities] of Drs. Prem Sarin [second in command at Gallo's Laboratory of Tumor Cell Biology (LTCB)] and [Zyed] Salahuddin, two scientists under Gallo's direct supervision in the LTCB; (2) a report from the Office for Protection from Research Risks (OPRR) censuring Dr. Gallo for failing to comply with HHS human subjects regulations and NIH human subject policies in his collaboration with Dr. Daniel Zagury in 1986 and 1987, experiments which resulted in the deaths of several subjects; (3) a 1988 report from the NIH Division of Management Survey and Review (DMSR) documenting Dr. Gallo's abuse of leave and suggesting that Dr. Gallo may have been absent from the LTCB for at least six months in 1987, absences that suggest an abrogation of his duties as a Lab Chief; and (4) a 1991 Memorandum from the Director of NIH and the Director of the National Cancer Institute imposing restrictions on Dr. Gallo's activities and mandating certain affirmative steps to bring Dr. Gallo's conduct within accepted standards for NIH.... Finally, ORI will present testimony from NIH Scientific Directors that at a meeting to discuss Dr. Gallo's behavior as a Lab Chief, his conduct was determined to be wholly outside the standards for a Lab Chief within NIH.... ORI will show that Dr. Gallo has demonstrated a pattern of behavior which effectively disregards and violates the acceptable standards of conduct at NIH and the scientific community at large. He has demonstrated a pattern of conduct that repeatedly misrepresents, distorts and suppresses data in such a way as to enhance his own claim to priority and primacy in AIDS research.

appear to be better organized and operated than its HHS counterpart.

In an interview last week with SGR, ORI Director Lyle Bivens observed that to sustain a finding of misconduct, ORI must now satisfy the strict legal criteria raised by the Board. "The Board is holding us to a standard to prove intent and

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... Lawyers Now Play Big Role in Misconduct System

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that the alleged misconduct was material," said Bivens, a research psychologist formerly at the National Institute of Mental Health.

Referring to the misdeeds specifically cited in the PHS misconduct regulations—"fabrication, falsification, or plagiarism"—Bivens said, "We felt they would be considered misconduct *per se*." But now, he said, it is not sufficient to show that misconduct occurred and to identify the culprit.

Reminded that the system was originally set up by scientists who wanted to keep misconduct proceedings within the "family" and out of the legal system, Bivens replied, "The hope that it would be a scientific proceeding was doomed from the beginning."

Describing ORI's relationship with the Appeals Board, Bivens said, "It's a special arrangement," adding, "We could change the Board's findings to be advisory to the Secretary [of HHS] if we choose." But, he said, "We chose the Board. We could have gone to the American Arbitration Association. We did it to ourselves." He did not indicate that any change in the relationship with the Appeals Board is contemplated by ORI.

In the first and so far only ORI case to completed by the Appeals Board, against Rameshwar K. Sharma, formerly of the Cleveland Clinic Foundation, the Appeals Board on August 6 rejected ORI's findings of misconduct. Accusations of fabricated data by Sharma on two NIH grant applications, including "anticipatory writing" about research data not yet in hand, were dismissed as innocent errors by the Appeals Board, which concluded: "Although some of his statements are ambiguous, and at times reflect communication problems, none of his statements, individually or collectively, persuasively demonstrates any intent to deceive."

Regarding "anticipatory writing" in Sharma's grant applications, the Board cryptically stated in a footnote: "For one thing, claiming to have cited non-existent data but to have hoped to obtain it or make a correction is not exculpatory, yet Dr. Sharma behaved as if he thought he had offered explanations of honest error and expected exoneration rather than as if he had confessed."

The Sharma outcome was a heavy blow for ORI, and occurred within days of public disclosure of an embarrassing event at a government agency responsible for enforcing good behavior in science: an ORI employee's accusation of sexual harassment by Clyde A. Watkins, Acting Director of ORI's Research Investigations Division. The charges were filed in late June; Watkins has been placed on administrative leave.

Besides being the first to come through the newly established appeals process, the Sharma case figured prominently in the public animosity between NIH Director Healy and Congressman Dingell. The case occurred at the Cleveland Clinic when Healy, pre-NIH, was serving there as chief of research. In an internal inquiry, a committee chaired by Healy initially exonerated Sharma of charges of falsification

on the NIH grant applications. Uneasy with the finding, Healy ordered a second inquiry, which concluded that the charges warranted an investigation—a higher and more serious level of scrutiny in the misconduct-review process. The investigation cleared Sharma.

Whereupon Congressman Dingell soared into paranoid orbit. Denouncing the outcome as further evidence that science is soft on fraud, Dingell accused Healy of a whitewash to protect her own reputation. He also charged that her rough handling of the Office of Scientific Integrity at NIH was in retaliation against OSIR's early probings of the Sharma case.

Healy, expressing outrage at Dingell's allegations, shifted the case out of the NIH-based Office of Scientific Integrity, to the Office of Scientific Integrity Review (OSIR), in the Department. Heading OSIR was none other than Lyle Bivens, who later became Acting Director and then, on October 3, the full-fledged Director of ORI. The Sharma case was Bivens' case.

Is it a blot on ORI's competence, as some observers of the agency contend? Bivens regards the experience as part of the learning process for ORI. "They say we lost Sharma, and so the office is down the toilet. Well, it's not," Bivens told SGR. There's an analogy in the evolution of regulations for research on human subjects, he said, pointing out that the startup of that process encountered resistance and uncertainty.

"I hope in five of six years, we'll be running smoothly," Bivens said, noting that, under ORI's prodding and guidance, non-government research organizations are getting better at handling misconduct cases. The caseload at ORI, about 75 per year, originates in cases at NIH and other PHS agencies and disputed outcomes in grantee institutions. So far, very few have been carried to the Departmental Appeals Board.

But by establishing precedents in virgin legal territory, the rulings of the Board project an influence far beyond specific cases. After the Sharma decision, a loss for ORI in the Gallo case would justify serious doubts about the competence of the Office of Research Integrity. In the Popovic proceedings, ORI's attorneys often bumbled about, and the consensus in the hearing room was they were clearly outperformed by Popovic's legal team, headed by Barbara Mishkin, of Hogan & Hartson, a blue-chip Washington firm. Gallo is represented by the same lawyer who represented Sharma, Joseph Onek, of Crowell & Moring, another high-powered firm.

In finding against Gallo, ORI recommended a feather-weight but humiliating penalty—close supervision of the renowned scientist for three years. But among ORI watchers consulted by SGR, the expectation is that ORI will be unable to satisfy the Board of Appeals' criteria for establishing misconduct.

One seasoned observer put it this way about ORI: "They're going to lose all their cases."—DSG

Clinton's Plans for R&D on Super-Car Draw Wild Fire

It got a bit over-hyped, as often happens when Presidents are parched for good news. But, even so, the hostile reactions to the Clinton Administration's proposal for designing a super-efficient, low-emission automobile have been theatrically excessive.

Among the reviews was one last week by *New York Times* columnist William Safire, who asked, "Who is the most powerful business executive in the United States today?" Safire's answer: Mary Good, the Commerce Department's chief of technology and top official for the auto project, whom he described as "the designated czar of the US automobile industry." Motherly Mary Good?

Announced with White House fanfare on September 29, the automotive plan vaguely outlines collaboration between the Big Three automakers and government labs, especially in the financially sagging Departments of Defense and Energy. The goal, Clinton said, is to triple today's fuel efficiency within 10 years and virtually eliminate automotive pollution.

The most treasured form of currency in financially beleaguered Washington, "new money," was not discussed, except to say that each party would contribute resources and that the government labs would focus on long-term problems, while the industrial labs pursued near-term results.

Clinton went on to describe the project as "a technological venture as ambitious as any our nation has ever attempted"—a puzzling assertion, given that automakers in Japan and elsewhere have already produced prototypes in the 80-100-miles-per-gallon range.

The following day, in awarding Medals of Science and Technology at a White House ceremony, Clinton reverted to super-car, describing it to the assemblage of distinguished recipients and onlookers as "a great gamble" and "an unprecedented joint venture with the Big Three automakers, our national defense labs, and our other federal scientific research facilities...."

The chief architect of the venture, John Gibbons, the President's Assistant for Science and Technology, has been a bit more circumspect than his political chiefs, telling the *Washington Post*, "There are really a lot of good ideas. But the payoff? We don't know where it is yet."

Vice President Al Gore, on the other hand, was characteristically enthusiastic. The government-industry partnership, he told the *Times*, is "an enormous breakthrough"—though today's high-tech landscape includes many such partnerships, ranging from SEMATECH to the public-private Advanced Battery Consortium working on propulsion for electric cars.

A negative chorus has joined Safire in declaring that there will be no payoff beyond make-work for the federal labs and a free ride for the Big Three, who, the critics insist, should pay for their own research.

The companies, normally wary of government, have signed on because "they seem to have gotten an unbeatable bargain," according to Robert J. Samuelson, economics

columnist for the *Post*. "They promise no money, get access to federal research, and if the super-car results, can produce it. Meanwhile, they hope they've won an informal commitment from Clinton to delay any big increase in federal fuel economy regulations until their joint research confirms the practicality of higher requirements."

Murray Weidenbaum, of Washington University, Chairman of the Council of Economic Advisers under Reagan, told *Science* that he sees "a boondoggle potential," while Ralph Nader fears unwarranted subsidies for industry.

The underlying realities of the super-car deal are political, technical, and economic, and at this point, there's no basis for either cheers or jeers. There is no doubt that within several decades or less, worldwide petroleum supplies will run down and the US transportation system will croak unless alternative propulsion systems are available.

The most direct way to induce the automobile industry to get to work on this problem would be to decree vastly improved fuel-consumption requirements in combination with sharply increased fuel taxes. But that formula is political suicide. Americans regard cheap fuel as a Constitutional right. Real prices for gasoline are lower than they were 25 years ago, even with the recent tax increase—a piddling 4.3 cents per gallon that has elicited considerable groaning.

The automobile industry has a disgraceful record of ignoring socially beneficial technical innovations, such as fuel economy, seatbelts, and airbags—unless forced by federal statute and public pressure. But, lacking a stick and public support, Clinton has reached for the carrot, and in the process has raised hopes for new work at major federal labs that once thrived on Cold War assignments.

At this point, it's important to understand that the automotive plan is in a fetal stage, and the outcome remains uncertain. Not to be excluded, however, is the possibility of fruitful collaboration. If a super-car emerges from the collaboration, there will be no grounds for complaint.

But it should be noted that the US political process is fickle and unpredictable in many matters, but especially so when the uncertainties of high-tech development are involved. This is not the first time around for the concept of government-industry R&D collaboration for a more benign car. During the Carter Administration, Presidential Science Advisor Frank Press proposed the creation of a Cooperative Automotive Research Program (CARP), also involving the Big Three and government researchers.

In that period, executives of the auto companies quaked at the antitrust risks of working together, despite assurances of tolerance by the Justice Department. Warnings against government dictating "industrial policy" were sounded.

Press made some progress in winning support for CARP, and if Carter had been reelected, it's likely that something along the lines proposed by Press would have been tried. When Reagan took office, the concept was dismissed as "industrial policy."—DSG

More IN PRINT: Return of TB, State R&D, Bio Survey

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nations that it's in their self-interest to forgo these weapons. James E. Goodby, Carnegie Mellon University, initially chaired the advisory panel for the report; he was succeeded by James F. Leonard, Executive Director of the Washington Council on Non-Proliferation.

The report, requested by the Senate Committees on Foreign Relations and Governmental Affairs, is part of an OTA series that began in August with *The Chemical Weapons Convention: Effects on the US Chemical Industry* (GPO Stock No. 052-003-01331-2; 69 pp., \$4.75). Another report, *Technologies Underlying Weapons of Mass Destruction*, will be published shortly. A final report, discussing non-proliferation policies, will be issued next year.

Another from OTA: *The Continuing Challenge of Tuberculosis* (GPO Stock No. 052-003-01341-0; 148 pp., \$9.50), describes the resurgence of TB and discusses screening programs and other steps for controlling the disease. Money, as usual, is cited as a limiting factor. The study, requested by several House and Senate Committees, included an OTA workshop last March with health specialists from government, academe, industry, and public-interest organizations.

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State Science and Technology Programs (GPO Stock No. 552-070-15049-8; 98 pp., \$3.75), text of a hearing March 31 by the Science Subcommittee of the House Science, Space, and Technology Committee. Little noted by the national press, state R&D programs for boosting economic growth are estimated to have grown to a couple of billion dollars a year in direct state funds and matching contributions. Testifying about their experiences were officials from some of the biggest and oldest programs, in Ohio, Texas, New York, Michigan, and Pennsylvania. Though there's much to be said on this subject, time was short and the discussions were skimpy, as is often the case on the overcommitted Congressional agenda: The hearing was officially clocked at 1 hour and 59 minutes.

Also from the House Science Subcommittee: *High Performance Computing and Network Program* (GPO Stock No. 552-070-15039-1; 215 pp., \$8), text of a hearing February 2 on NSF's plans for transforming its highly successful NSFNET into a farther-reaching National Research and Education Network, as mandated in the High Performance Computing Act of 1991. The witnesses included representatives from EDUCOM, a major user consortium of information services; the Federation of American Research Networks; the American Library Association, and the Washington-based Computer Systems Policy Project.

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A Biological Survey for the Nation (192 pp., \$26, plus \$4 for shipping), from the National Academy of Sciences, cheers for the National Biological Survey that Secretary Bruce Babbitt has established in the US Interior Department. But take it further, the report recommends, by bringing federal and state governments, universities, museums, etc., into a National Partnership for Biological Survey, led by the new Interior agency.

The Academy proposal, by a committee chaired by Peter Raven, Director of the Missouri Botanical Garden, says a broader approach is desirable to orchestrate the work of the many governmental and private organizations concerned with environmental and biodiversity issues. The overall goal, the report says, should be to coordinate research and make information available "in a coherent and usable way to the many agencies and other organizations that have responsibilities for protecting, restoring, and managing biological resources."

Order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 1/800-624-6242; in the Washington, DC, area: 202/334-3313.

Science Policy in the Netherlands (24 pp., no charge), published by The Netherlands Ministry of Education and Science, quarterly in English, six times a year in Dutch. The latest issue includes articles on the Netherlands Organization for Technology Assessment, health research outside of universities, European plans for a center for Very Long Baseline Interferometry in The Netherlands, art history, and alternatives to animal testing, plus short news reports.

Order from: Ministry of Education and Science, PO Box 25000, 2700 LZ Zoetermeer, The Netherlands.

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IN PRINT: Federal Labs, Foreign Technology, Etc.

The publications listed are obtainable as indicated—not from SGR.

Federal Research: Aging Federal Laboratories Need Repairs and Upgrades (GAO/RCED-93-203; 52 pp., no charge), by the General Accounting Office (GAO), reporting a \$3.8-billion maintenance and modernization backlog at labs of eight departments and agencies, a group that accounted for 72 percent of the \$25 billion spent on inhouse R&D in 1992. With only one-quarter of the lab space less than 20 years old, the GAO says, compliance with current regulatory standards is increasingly difficult and breakdowns interfere with research. At the Beltsville (Md.) Agricultural Research Center, the report states, "Electrical power outages have interrupted, and sometimes even ruined, experiments." At the National Institutes of Health, "the work of over 200 NIH scientists was virtually halted for 1 week when an old circuit breaker malfunctioned." Similar misfortunes were reported at labs of the Departments of Defense and Energy, NASA, the National Institute of Standards and Technology, the Environmental Protection Agency, and others. The agencies have drawn up remedial plans, the GAO reports, but money is scarce for carrying them out. The GAO study was requested by Senator Paul Sarbanes (D-Md.), Vice Chairman of the Joint Economic Committee, and reviewed data from 220 labs.

Also from the GAO: **Foreign Technology: Collection and Dissemination of Japanese Information Can Be Improved** (GAO/NSIAD-93-251; 40 pp., no charge), says the Japanese government works hard and effectively at collecting foreign technology information, while US government efforts are uncoordinated and scattered among dozens of agencies. Senator Jeff Bingaman (D-New Mexico), Chairman of the Armed Services Subcommittee on Defense Technology, Acquisition, and Industrial Base, requested the report.

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20884-6015; tel. 202/512-6000; fax 301/258-4066.

Can the Impact of Basic Biomedical Research Be Measured?: A Case Study Approach (26 pp., no charge), a product of fiscal anxiety in the biomedical community, from the Federation of American Societies for Experimental Biology (FASEB), champion of bench scientists in Washington biomedical politics: An exercise claiming rich returns from investments in research, in this case, research that led to the methodology for producing monoclonal antibodies (MAb). Though hedged with cautions about "constraints on data availability and time," the FASEB study suggests that science is a golden investment. The breakthrough work on hybridoma technology reported in 1975 by Georges J.F. Kohler and Cesar Milstein is estimated to have cost \$330,000. According to a market-analysis firm, the report says, sales from medical and industrial applications for MAb totaled

\$1.9 billion in 1991 and are projected at \$4 billion in 1996. Examining the payoff from the application of MAb technology to the development of bloodscreening for HIV, the FASEB report comes up with a benefit-to-cost ratio of 19:1. The report was prepared by Daniel J. Raiten and Stanley M. Berman, of FASEB's Life Sciences Research Office.

Order from: FASEB, LSRO, 9650 Rockville Pike, Bethesda, Md. 20814-3998; tel. 301/530-7030; fax 301/571-1876.

Dismantling the Bomb and Managing the Nuclear Materials (GPO Stock No. 052-003-01343-6; 202 pp., \$12), from the Congressional Office of Technology Assessment (OTA), an extremely critical review of US preparations for disposing of nuclear warheads. Authority is scattered among several agencies, OTA reports; goals and policies have not been clearly stated, and problems are compounded by public distrust arising from the Department of Energy's "poor record with respect to environmental and safety matters." OTA notes, too, that the dismantling efforts are shielded by the same nuclear secrecy that was legislated on national security grounds during the Cold War. Included are texts of Russian-American agreements on strategic weapons and disposal of nuclear materials. The report was requested by Senator John Glenn (D-Ohio), Chairman of the Senate Governmental Affairs Committee, and was prepared with the assistance of an advisory panel chaired by John E. Till, of the Radiological Assessments Corp.

Also from OTA: **Aging Nuclear Power Plants: Managing Plant Life and Decommissioning** (GPO Stock No. 052-003-01342-8; 183 pp., \$11), says the long-term prospects are uncertain for the nation's 107 operating nuclear plants, though safety and reliability have been good since the Three Mile Island accident in 1979. OTA notes, however, that since 1989, six plants have been retired early because of safety concerns and economic pressures, and that some analysts forecast another 25 premature retirements in the coming decade. OTA expresses confidence in the existing technologies for decommissioning, but warns that the mandated financial set asides for dismantling the plants and disposing of nuclear materials may fall short in cases of early retirement. Senator Glenn also requested this one; Richard E. Schuler, of Cornell University, chaired the advisory panel for the study.

Proliferation of Weapons of Mass Destruction: Assessing the Risk (GPO Stock No. 052-003-01335-5; 123 pp., \$7), says many technical, political, and economic impediments can be put in the way of rogue states seeking to develop super-lethal weapons. But OTA also reckons that "a state that badly wanted to wreak destruction on a US city probably could do so, whether it had advanced delivery systems or not—and whether the United States had effective defenses against such advanced delivery systems or not." The most effective non-proliferation technique, the report states, is to persuade

(Continued on Page 7)

